

TRANSPORTATION POOLED FUND PROGRAM QUARTERLY PROGRESS REPORT

Lead Agency (FHWA or State DOT): WisDOT

INSTRUCTIONS:

Project Managers and/or research project investigators should complete a quarterly progress report for each calendar quarter during which the projects are active. Please provide a project schedule status of the research activities tied to each task that is defined in the proposal; a percentage completion of each task; a concise discussion (2 or 3 sentences) of the current status, including accomplishments and problems encountered, if any. List all tasks, even if no work was done during this period.

Transportation Pooled Fund Program Project # <i>(i.e., SPR-2(XXX), SPR-3(XXX) or TPF-5(XXX))</i> TPF-S(270)	Transportation Pooled Fund Program - Report Period: <input type="checkbox"/> Quarter 1 (January 1 – March 31) <input type="checkbox"/> Quarter 2 (April 1 – June 30) <input checked="" type="checkbox"/> Quarter 3 (July 1 – September 30) <input type="checkbox"/> Quarter 4 (October 1 – December 31)	
Project Title: Recycled Materials Resources Center- Third Generation (RMRC-3G)		
Name of Project Manager(s): Angela Pakes Ahlman and Tuncer B. Edil	Phone Number: 608-890-4966	E-Mail angela.pakes@wisc.edu
Lead Agency Project ID: TPH-5(270)	Other Project ID (i.e., contract #):	Project Start Date: August 30, 2012
Original Project End Date: September 30, 2015	Current Project End Date: December 31, 2015	Number of Extensions: 0

Project schedule status:

- On schedule
 On revised schedule
 Ahead of schedule
 Behind schedule

Overall Project Statistics:

Total Project Budget	Total Cost to Date for Project	Percentage of Work Completed to Date
\$42,097.00	\$39,975.38	95%

Quarterly Project Statistics:

Total Project Expenses and Percentage This Quarter	Total Amount of Funds Expended This Quarter	Total Percentage of Time Used to Date
\$5,175.96; 12.3%	\$5,175.96	95%

Project Description:

The goal of RMRC-3G is to provide the resources and activities needed to break down barriers and increase utilization of recycled materials and industrial byproducts. This is being done through carefully integrated and orchestrated activities that include applied research in key areas relevant to transportation applications combined with outreach programs that provide the educational and technical resources needed to maximize the rate at which recycled materials and industrial byproducts are used in transportation applications.

Progress this Quarter (includes meetings, work plan status, contract status, significant progress, etc.):

Admin Contract: Sub-meetings were held with the research advisory group for each RMRC project. A contract amendment submitted and approved near the end of the quarter to allow for the continuation of the three research projects and outreach responsibilities.

Phone calls and emails were used as means to promote the RMRC-3G. Calls and emails through the website were responded to. The website is reviewed and improved continually.

As follow up from ADC60 meeting, a presentation was prepared and presented to ODOT and EPA Region 9. We anticipate following up with both groups next quarter to gauge their interest in future rounds of RMRC. Another meeting was setup at the request of US EPA who heard about the projects at the June ADC60 meeting. The US EPA has expressed interest in the LCA/LCCA analysis as well as the Web Map project.

Abstract and presentation for AASHTO Subcommittee on Materials was prepared and presented at the AASHTO meeting three of the active RMRC projects. Connections were made with Cyrus Parker at NC-DOT who expressed interest in future rounds of RMRC

Development of Recycled Materials Informational Data Sheets and Quantification of System-Wide Life Cycle Benefits –

As noted in quarter 2, data collection from two member states (VDOT and PennDOT) are taking longer than expected, but states are committed to working on delivering needed project information. This quarter, more data was received and analyzed the newer data began. Complete data collection from other four member states. Report drafting stated.

Use of Recycled Materials as Mechanically Stabilized Earth (MSE) Retaining Wall Reinforced Backfills –

In this quarter we continued progressing on Tasks 1, 2, and 3 which include literature review, critical assessment of the recycled materials, and laboratory testing. Pull-out tests and direct shear tests on Geotextile-RCA, Geotextile-RAP, Geogrid-RCA, Geogrid-RAP were completed to obtain the interface shear strength. Thermal preloading tests on Geotextile and Geogrid-RAP interface shear strength were conducted to evaluate the effect of thermal preloading on interface shear strength. Systematic creep tests at different temperatures were conducted on compacted RAP. Systematic creep tests were also conducted on different sources of foundry sand to evaluate the effect of bentonite content on compressibility. Set-up of large-scale triaxial cell is also complete and the tests will start soon. From the results of the tests, two papers were drafted for Geo-congress 2016.

All of the RCA tests with nonwoven geotextile are completed and the electrochemical properties of the RCA is assessed based on the leachate collected from the GRT tests with RCA samples. We also evaluated two image analyses from non-woven and woven geotextiles to evaluate clogging. We also performed two GRT Tests using non-aged RCA and woven geotextile (HP570). The results indicated that for lower hydraulic gradients, both tests did not exhibit any clogging behavior. However, the permeability ratio of one of the duplicate tests (RCA-01) showed a significant increase in permeability ratio when the hydraulic gradient was increased to $i=2.5$. Since these materials were tested as received, the fine content within the whole sample as well as within each layer was not controlled. It is speculated that this may be the a reason for the observed behavior.

Web Connection –

This quarter, the project team continued to develop the website to support the web map. One of the major developments included adding the case study panel, which allows advanced users to locate, add, and update information for projects

that have successfully utilized recycled materials. About and Help panels were also added to provide an overview of the site functionality, a disclaimer, user guide, and video tutorials. In addition, administrators can now assign login credentials to users based on their role. The four website roles are: general user (no login required), facility/provider, advanced user (researcher or agency), and administrator. Specifications and regulations for Illinois and Georgia are currently being collected. Beta testing has been initiated, and feedback from users has been integrated to the website. A plan for collecting stockpile data will be developed next quarter. A paper was submitted and accepted for presentation at the TRB Annual Meeting. Weekly internal meetings have been held this quarter to discuss user feedback, progress on website development, and beta site testing.

Project Schedule Status

Task 1: Research Advisory Group.....	100%
Task 2: Requirements Collection.....	100%
Task 3: Database Schema Design.....	100%
Task 4: User Interface Design.....	100%
Task 5: Site Design and Development.....	90%
Task 6: Map Functionality.....	90%
Task 7: Recycled Material Data Collection and Beta Site Testing....	50%
Task 8: User's Manual and Final Report.....	75%

Anticipated work next quarter:

- Sub-meetings will be held with the research advisory group for each RMRC project.
- RMRC Member meetings to review all projects and receive feedback on each.
- Report drafting on each project and presentation preparation for TRB annual meeting.
- Continue with “**Development of Recycled Materials Informational Data Sheets and Quantification of System Life Cycle Benefits**” and complete data collection from all member states. Review the benefit analysis methodology. Complete the LCA and begin the LCCA.
- **MSE Walls** - We anticipate completing Tasks 3 and 4 and submit a draft report to RMRC members for review.
- **Web Connection** – refinements to database and building case studies within, checking on environmental regs. Beta site testing, user manual and report drafting.

Significant Results:

- Continued outreach activities for active members, future potential members and industry.
- Held weekly meetings to discuss progress of each project.
- Analyzed statewide materials use for all states and began looking at the life cycle assessment values. Noted significant savings in water, energy and CO₂ emissions that were consistent across the board.
- At the request of Steve Krebs at WisDOT we drafted an abstract to submit to National Roads Research Alliance on the State Wide Materials Use project.

Circumstance affecting project or budget. (Please describe any challenges encountered or anticipated that might affect the completion of the project within the time, scope and fiscal constraints set forth in the agreement, along with recommended solutions to those problems).

Principal Investigators on projects submitted NCTEs and those were approved for 12/31/15. The original contract amendment was made for the admin contract at the very end of this quarter, but funding had not yet been transferred as reflected in the budget above. This will be reflected in the last quarterly report of 2015. The Executive Committee members are in discussion regarding a future pooled fund once the current program ends in Jun 2016.

Potential Implementation:

The three research projects will have significant implementation potential for advancing the use of recycled materials in infrastructure, reductions in energy use, water use and CO₂ emissions and resourcing for greater use through the web map project.